SEQUENCE LISTING

<110> Tomb, Jean-Francois
Bramucci, Michael G.
Cheng, Qiong
Kostichka, Kristy N.

<120> Rhodococcus Cloning and Expression Vectors

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Pro Ile Ser Gly Val Asn Gly Val Thr Ile Val Asn Gly Pro Lys Gly
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Ser Gly Phe Gly Gly Leu Arg Ser Cys Gly Lys Gly Trp Ile Cys Pro
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Cys Cys Ala Gly Lys Val Gly Ala His Arg Ala Asp Glu Ile Ser Gln
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Glu Cys Ala Leu Val Glu Gly Phe Val Pro Gly Gln Gly Phe Phe Asp
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Gln Pro Gly Leu Arg Arg Gln Met Ile Arg Thr Val Arg Val Gly Glu
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<213> Rhodococcus AN12

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<210> 9

<211> 19

<212> DNA

<213> Primer

<400> 9
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<210> 10

<211> 16

<212> DNA

<213> Primer

<400> 10
taccttgtta cgactt 16

<210> 11

<211> 17

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<400> 11
gtgccagcag ymgcggt 17

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acgggagaaa gcaggggacc ttcgggcctt gcgctatcag atgagcctag gtcggattag 180

ctagttggtg aggtaatggc tcaccaaggc gacgatccgt aactggtctg agaggatgat 240

cagtcacact ggaactgaga cacggtccag actcctacgg gaggcagcag tggggaatat 300

tggacaatgg gcgaaagcct gatccagcca tgccgcgtgt gtgaagaagg tcttcggatt 360

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<213> Primer

<400> 13
gtaaaacgac ggccagt 17

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<211> 24

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<400> 14
agcggataac aatttcacac agga 24

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ggatacatcc gagtgaatcc ggaattgagc gccgatggga tccagtggac taacccagat 180

ggaaaggtca tcacgtcgcc gtactcgaag accagcgcgt gcggtgacgt gccagtgcct 240

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<212> DNA

<213> Rhodococcus AN12

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tggttgcatc gaaatcctgt gcgccctcga tgattccggg aaattcttcc agtacgagca 180

ggatgagagg tagtgctggc gagaacaacg aaattttgtc tatgcgtcga tcccagaaac 240

actcgattcg tcggtcagat tctgctttga cgaactggag cactcggagg actttgtcaa 300

aatcgttcag cccgagctcg atgttcggtt casccggtcg tcggtggacg aatggggcta 360

gtaagacgga agtgggatcg actccgacga cacgcacagc gggattcgat ccagcctgtg 420

cgagcaggtt gtaggtgcat tgagattttc cggaacgggt tttgccttga atgagccagt 480

gagcagcatc tttggctata tcgaccatga caggttgagc tag 523

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<213> Rhodococcus AN12

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tggtcgaagg attcgtccct ggtcaaggct tcttcgacca acccggacta cggcgccaaa 180

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aacgactgca ctccggatca aatcaggctg gccgaacgat catctcgtaa taactgaaat 540

actcagggcc agagtaggtt tggaaggcca agctgtcgtc gacgaacttc gcggcatgca 600

gatcac 606

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<212> DNA

<213> Primer

<400> 18
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<210> 19

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<213> Primer

<400> 20
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<212> PRT

<213> Arcanobacterium pyogenes

<400> 21

Met Asn Arg Leu Ser Glu Arg Thr Ala Leu Ser Leu Pro Ala Arg Gln
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Ile Gln Lys Val Ile Pro Ala Ala Gly Gly Arg Ser Leu Lys Ser Phe
20 25 30

Glu Gly Met Thr Ala Thr Trp Ser Ala Arg Gly Gly Ala Ser Ser Asp
35 40 45

Glu Arg Ser Arg Asp Lys Arg Ser Gln Ile Pro Ser Asn Arg Arg Glu
50 55 60

Gly Arg Ser Ala Thr His Pro Leu Gly Asn Thr Val Leu Thr Phe Pro
65 70 75 80

Val Ser Asn Glu Ser Lys Lys Thr Ala Lys Ser Arg Arg Ser Glu Arg
85 90 95

Tyr Glu Leu Arg Asp Gly Leu Ala Glu Ile Ser Thr Ile Glu Ser Val
100 105 110

Arg Lys Cys Gly Arg Val Pro Val Ala Pro Leu Val Ser Leu Arg Ala
115 120 125

Lys Ser Asp Gly Lys Gly Ala Gly Tyr Gly Gly Leu His Thr Cys Gly
130 135 140

Ser Val Trp Ala Cys Pro Val Cys Ser Ala Lys Ile Ala Ala Arg Arg
145 150 155 160

Lys Thr Asp Leu Gln Gln Val Val Asp His Ala Val Lys His Gly Met
165 170 175

Thr Val Ser Met Leu Thr Leu Thr Gln Arg His His Lys Gly Gln Gly
180 185 190

Leu Lys His Leu Trp Asp Ala Leu Ser Thr Ala Trp Asn Arg Val Thr
195 200 205

Ser Gly Arg Arg Trp Ile Glu Phe Lys Glu Gln Phe Gly Leu Val Gly
210 215 220

Tyr Val Arg Ala Asn Glu Ile Thr His Gly Lys His Gly Trp His Val
225 230 235 240

His Ser His Val Leu Ile Ile Ser Glu Lys Asp Pro Leu Thr Ser Thr
245 250 255

Phe Val Tyr Gln Arg Lys Gln Gly Arg Arg Arg Leu Pro Tyr Pro Pro
260 265 270

Glu Ile Tyr Met Ser Ser Asp Phe Ile Ala Glu Arg Trp Glu Ala Gly
275 280 285

Leu Ala Lys His Gly Val Asp Phe Leu Arg Asp Ser Gly Gly Leu Asp
290 295 300

Trp Thr Val Ala Lys Asp Ala Arg Ala Ile Gly Asn Tyr Val Ser Lys
305 310 315 320

Met Gln Thr Ser Thr Asp Ala Ile Ser Ser Glu Val Thr Leu Gly Gly
325 330 335

Phe Lys Lys Ala Arg Asn Gly Asn Arg Thr Pro Phe Gln Ile Leu Ala
340 345 350

Asp Ile Leu Ser Leu Gly Asp Val Asp Asp Leu Lys Leu Trp Lys Glu
355 360 365

Tyr Glu Lys Ala Ser Phe Gly Arg Arg Ala Leu Thr Trp Ser Lys Gly
370 375 380

Leu Arg Asp Trp Ala Asn Leu Gly Val Glu Gln Ser Asp Glu Glu Ile
385 390 395 400

Ala Ser Glu Glu Ile Gly Asp Glu Ala Ile Ala Leu Phe Thr His Asp
405 410 415

Ala Trp Arg Gln Val Arg Arg Phe Gly Ala Ala Glu Leu Leu Asp Val
420 425 430

Thr Glu Ser Gly Gly Arg Ala Ala Ala Tyr Arg Trp Leu Asp Phe Arg
435 440 445

Glu Ile Asp Trp Ser Leu Pro Pro Lys Ile Glu
450 455

<210> 22

<211> 456

<212> PRT

<213> Streptomyces lividans

<400> 22

Met Asp Pro Ala Ser Gly Val Ile Val Ala Gln Thr Ala Ala Gly Thr
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Ser Val Val Leu Gly Leu Met Arg Cys Gly Arg Ile Trp Leu Cys Pro
20 25 30

Val Cys Ala Ala Thr Ile Arg His Lys Arg Ala Glu Glu Ile Thr Ala
35 40 45

Ala Val Val Glu Trp Ile Lys Arg Gly Gly Thr Ala Tyr Leu Val Thr
50 55 60

Phe Thr Ala Arg His Gly His Thr Asp Arg Leu Ala Asp Leu Met Asp
65 70 75 80

Ala Leu Gln Gly Thr Arg Lys Thr Pro Asp Ser Pro Arg Arg Pro Gly
85 90 95

Ala Tyr Gln Arg Leu Ile Thr Gly Gly Thr Trp Ala Gly Arg Arg Ala
100 105 110

Lys Asp Gly His Arg Ala Ala Asp Arg Glu Gly Ile Arg Asp Arg Ile
115 120 125

Gly Tyr Val Gly Met Ile Arg Ala Thr Glu Val Thr Val Gly Gln Ile
130 135 140

Asn Gly Trp His Pro His Ile His Ala Ile Val Leu Val Gly Gly Arg
145 150 155 160

Thr Glu Gly Glu Arg Ser Ala Lys Gln Ile Val Ala Thr Phe Glu Pro
165 170 175

Thr Gly Ala Ala Leu Asp Glu Trp Gln Gly His Trp Arg Ser Val Trp
180 185 190

Thr Ala Ala Leu Arg Lys Val Asn Pro Ala Phe Thr Pro Asp Asp Arg
195 200 205

His Gly Val Asp Phe Lys Arg Leu Glu Thr Glu Arg Asp Ala Asn Asp
210 215 220

Leu Ala Glu Tyr Ile Ala Lys Thr Gln Asp Gly Lys Ala Pro Ala Leu
225 230 235 240

Glu Leu Ala Arg Ala Asp Leu Lys Thr Ala Thr Gly Gly Asn Val Ala
245 250 255

Pro Phe Glu Leu Leu Gly Arg Ile Gly Asp Leu Thr Gly Gly Met Thr
260 265 270

Glu Asp Asp Ala Ala Gly Val Gly Ser Leu Glu Trp Asn Leu Ser Arg
275 280 285

Trp His Glu Tyr Glu Arg Ala Thr Arg Gly Arg Arg Ala Ile Glu Trp
290 295 300

Thr Arg Tyr Leu Arg Gln Met Leu Gly Leu Asp Gly Gly Asp Thr Glu
305 310 315 320

Ala Asp Asp Leu Asp Leu Leu Leu Ala Ala Asp Ala Asp Gly Gly Glu
325 330 335

Leu Arg Ala Gly Val Ala Val Thr Glu Asp Gly Trp His Ala Val Thr
340 345 350

Arg Arg Ala Leu Asp Leu Glu Ala Thr Arg Ala Ala Glu Gly Lys Asp
355 360 365

Gly Asn Glu Asp Pro Ala Ala Val Gly Glu Arg Val Arg Glu Val Leu
370 375 380

Ala Leu Ala Asp Ala Ala Asp Thr Val Val Val Leu Thr Ala Gly Glu
385 390 395 400

Val Ala Glu Ala Tyr Ala Asp Met Leu Ala Ala Leu Ala Gln Arg Arg
405 410 415

Glu Glu Ala Thr Ala Arg Arg Arg Arg Glu Gln Asp Asp Asp Gln Asp
420 425 430

Asp Asp Ala Asp Asp Arg Gln Glu Arg Ala Ala Arg His Ile Ala Arg
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Leu Ala Ser Gly Pro Thr Ser His
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<210> 23

<211> 528

<212> PRT

<213> Streptomyces phaeochromogenes

<400> 23

Met Leu Asn Arg Val Ser Gly Ile Asp Ala Cys Gly Gly Cys Gly Arg
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Arg Val Leu Asp Pro Asp Thr Gly Val Ile Tyr Ala Lys Ser Ser Arg
20 25 30

Gly Tyr Val Val Thr Ile Gly Leu Val Arg Cys Gly Arg Ile Trp Phe
35 40 45

Cys Pro Glu Cys Ser Ser Ala Ile Arg Arg Gly Arg Thr Glu Glu Ile
50 55 60

Lys Thr Gly Ala Leu Arg His Leu Ala Ala Gly Gly Thr Leu Ala Val
65 70 75 80

Val Val Leu Thr Ala Arg His Asn Gln Thr Thr Asp Leu Asp Ser Leu
85 90 95

Val Ala Ala Leu Trp Gly Gly Pro Leu Leu Asp Asp Lys Gly Ala Pro
100 105 110

Val Leu Asp Arg Ser Gly Lys Pro Arg Arg Ala Pro Gly Ala Tyr Gln
115 120 125

Arg Met Leu Thr Ala Pro Ala Phe Tyr Gly Arg Pro Glu Ala Arg Arg
130 135 140

Thr Arg Lys Asp Gly Thr Gln Tyr Val Arg Pro Ala Glu Asp Gly Ile
145 150 155 160

Arg His Arg Ile Gly Tyr Ile Gly Met Val Arg Ala Ala Glu Val Thr
165 170 175

Arg Ser Lys Lys Asn Gly Tyr His Pro His Leu Asn Leu Leu Val Phe
180 185 190

Leu Gly Gly Glu Leu Ser Gly Thr Pro Ala Lys Gly Asp Val Val Gly
195 200 205

His Phe Glu Pro Ser Glu Thr Asp Leu Gly Asp Trp Glu Asp Trp Leu
210 215 220

Arg Glu Met Trp Ala Gly Ala Leu Lys Arg Ala Asp Pro Lys Phe Glu
225 230 235 240

Pro Ser Thr Asp Cys Asp Thr Pro Gly Cys Lys Cys Lys Gly Lys Gly
245 250 255

His Gly Val Met Val Ser Ile Val Arg Ser Ala Asp Asp Val Ala Leu
260 265 270

Ile Glu Tyr Leu Thr Lys Asn Gln Asp Gly Lys Arg Glu Arg Pro Asp
275 280 285

Ser Val Asp Gln Asp Leu Glu Ala Ala Gly Ala Ala Ala Met Glu Thr
290 295 300

Ala Arg Leu Asp Ser Lys Thr Gly Arg Gly Arg Lys Ser Met Thr Pro
305 310 315 320

Phe Gln Ile Leu Tyr Arg Leu Trp Asp Ile Glu Val Ala Gly Leu Asp
325 330 335

Pro Asp Met Ala Glu Gly Tyr Gly Thr Pro Lys Gln Leu Arg Ala Trp
340 345 350

Trp Ala Gln Tyr Glu Glu Ala Leu Ala Gly Arg Arg Ala Ile Glu Trp
355 360 365

Thr Arg Gly Leu Arg Arg His Val Asp Leu Asp Gly Asp Asp Asp Glu
370 375 380

Glu Thr Asp Leu Gln Tyr Val Tyr Glu Pro Glu Ala Ala Pro Leu Asp
385 390 395 400

Gly Gly Val Val Leu Thr Ser Asp Ala Met Arg Leu Val Val Gly Ala
405 410 415

Asp Ala Glu Leu Asp Leu Asp Asp Val Val Arg Ala Glu Ala Tyr Tyr
420 425 430

Ser Ala Val Asp Val Val Thr Gly Leu Gly Gly Arg Ala Asp His Val
435 440 445

Arg Val Ala Thr Ala Glu Glu Leu Ala Glu Val Gln Glu Val Leu Phe
450 455 460

Ala Arg Thr Gln Glu Arg Ala Glu Glu Ser Arg Arg Gln Arg Arg Ile
465 470 475 480

Ala Glu His Glu Ala Glu Gln Ala Ala Ala His Arg Lys Arg Gln Glu
485 490 495

Leu Ala Arg Cys Leu Gly Leu Leu Val Arg Gln Arg Gly Gly Thr Gln
500 505 510

Asp Asp Ser Ala Ala Asp Asn Phe Val Ala His Ile His Ala Asn Arg
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<211> 451

<212> PRT

<213> Streptomyces nigirifaciens

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Val Cys Ala Ala Thr Ile Arg His Lys Arg Ala Glu Glu Ile Thr Ala
35 40 45

Ala Val Val Glu Trp Ile Lys Arg Gly Gly Thr Ala Tyr Leu Val Thr
50 55 60

Phe Thr Ala Arg His Gly His Thr Asp Arg Leu Ala Asp Leu Met Asp
65 70 75 80

Ala Leu Gln Gly Thr Arg Lys Thr Ala Asp Ala Pro Arg Arg Pro Gly
85 90 95

Ala Tyr Gln Arg Leu Ile Thr Gly Gly Thr Trp Ala Gly Arg Arg Ala
100 105 110

Lys Asp Gly His Arg Ala Ala Asp Arg Glu Gly Ile Arg Asp Arg Ile
115 120 125

Gly Tyr Val Gly Met Ile Arg Ala Thr Glu Val Thr Val Gly Gln Ile
130 135 140

Asn Gly Trp His Pro His Ile His Ala Ile Val Leu Val Gly Gly Arg
145 150 155 160

Thr Glu Gly Glu Arg Ser Ala Lys Gln Ile Val Gly Thr Phe Glu Pro
165 170 175

Ser Glu Ala Ala Leu Asp Glu Trp Gln Gly Gln Trp Arg Ala Val Trp
180 185 190

Thr Ala Ala Leu Arg Lys Val Asn Pro Gln Phe Thr Pro Asp Asp Arg
195 200 205

His Gly Val Asp Phe Lys Arg Leu Glu Thr Glu Arg Asp Ala Asn Asp
210 215 220

Leu Ala Glu Tyr Ile Ala Lys Thr Gln Asp Gly Lys Ala Pro Ala Leu
225 230 235 240

Glu Leu Ala Arg Ala Asp Leu Lys Thr Ala Asn Gly Gly Asn Val Ala
245 250 255

Pro Phe Glu Leu Leu Gly Arg Ile Gly Asp Leu Thr Gly Gly Met Thr
260 265 270

Glu Asp Asp Ala Ala Gly Val Gly Ser Leu Glu Trp Asn Leu Ala Arg
275 280 285

Trp His Glu Tyr Glu Arg Ala Thr Lys Gly Arg Arg Ala Ile Glu Trp
290 295 300

Thr Arg Tyr Leu Arg Gln Met Leu Gly Leu Asp Gly Gly Asp Thr Glu
305 310 315 320

Ala Asp Asp Leu Asp Leu Leu Leu Ala Ala Asp Ala Asp Gly Gly Glu
325 330 335

Leu Arg Ala Gly Val Ala Val Thr Glu Asp Gly Trp His Ala Val Thr
340 345 350

Arg Arg Ala Leu Asp Leu Ala Ala Thr Gln Ala Ala Glu Gly Thr Asp
355 360 365

Gly Asn Thr Asp Pro Ala Ala Met Gly Glu Arg Val Arg Glu Val Leu
370 375 380

Ala His Ala Asp Ala Ala Asp Ala Val Val Val Leu Thr Ser Gly Glu
385 390 395 400

Val Ala Glu Ala Tyr Ala Asp Met Leu Ala Ala Leu Ala Leu Arg Arg
405 410 415

Glu Glu Ala Ala Ala Arg Arg Arg Arg Glu Gln Asp Asp Asp Gln Asp
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Asp Asp Ala Asp Asp Arg Gln Glu Arg Ala Ala Arg His Ile Ala Arg
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Leu Arg Asn
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